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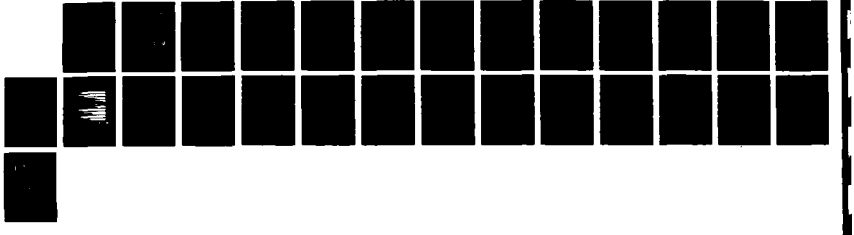

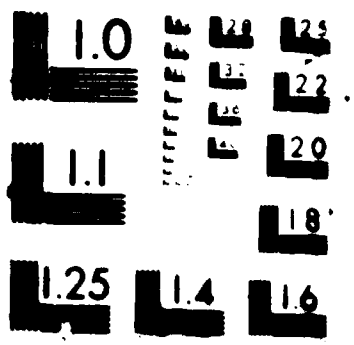
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GAO

United States General Accounting Office

Fact Sheet for the Chairman,
Subcommittee on Defense,
Committee on Appropriations,
House of Representatives

December 1987

BATTLEFIELD AUTOMATION

Army Command and Control Systems Acquisition Cost and Schedule Changes

GAO/NSIAD-88-42FS

GAO

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-223712

December 9, 1987

The Honorable Bill Chappell, Jr.
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

As requested in your October 30, 1986, letter and subsequent discussions with your Office, we updated cost, schedule, and status issues associated with the Army Command and Control System (ACCS) programs since our August 1986 report.[1]

Within the ACCS umbrella, there are five major command and control systems corresponding to the battlefield functional areas of air defense, combat service support, fire support, intelligence/electronic warfare, and maneuver control. Of the five systems, four will use the Department of Defense (DOD) standard programming language, Ada, and ACCS common hardware and software (ACCS CHS). The ACCS CHS program will also supply computers for a separate program at the unit level. In addition, three communication systems will link the command and control systems: (1) a telephone-like, areawide communications net known as the Mobile Subscriber Equipment program, (2) a voice radio combat net, and (3) a data distribution radio system.

The ACCS programs are estimated to cost $21.4 billion, over $7.4 billion for the command and control systems and over $13.9 billion for the communication systems. While these Army cost estimates increased by almost $2 billion from August 1986 to August 1987, they exclude items in one program costing about $3.2 billion. Including those items would increase the total ACCS program costs from $21.4 billion to $24.6 billion.

Estimated costs increased in six of the eight programs mainly due to quantity increases, and to a lesser extent, schedule delays, software development and production problems. One

[1]Battlefield Automation: Status of the Army Command and Control System Program (GAO/NSIAD-86-184FS, August 1986).

program has a lower cost estimate due to reduced requirements and quantities, and one program in the combat service support functional area is a new start.

Virtually, all ACCS program schedules have slipped during the August 1986 through August 1987 time frame because of problems in software development and with reliability of initial production models. Only the Mobile Subscriber Equipment program remains on schedule.

The Army's new Program Executive Officer Concept, which became effective May 1, 1987, is intended to streamline and improve the ACCS acquisition process. The Program Executive Officer for Command and Control Systems will oversee the five individual control systems as well as the ACCS CHS program, and report directly to the Under Secretary of the Army. The new structure could provide better management and synchronization of the ACCS related programs. There is another program executive officer for communications programs.

We discussed this report with DOD and Army officials and included their comments where appropriate. The objective, scope, and methodology of our review are described in appendix III. Appendix IV lists our other reports on ACCS related programs.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 days from its date. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,

Richard Davis
Associate Director

Contents

ABBREVIATIONS

ACCS	Army Command and Control System
ADDS	Army Data Distribution System
AFATDS	Advanced Field Artillery Tactical Data System
ASAS	All Source Analysis System
CHS	common hardware and software
CSSCS	Combat Service Support Control System
DOD	Department of Defense
EPLRS	Enhanced Position Location Reporting System
FAAD C2I	Forward Area Air Defense Command, Control, and Intelligence
GAO	General Accounting Office
JTIDS	Joint Tactical Information Distribution System
MCS	Maneuver Control System
MSE	mobile subscriber equipment
PLRS	Position Location Reporting System
SINCGARS	Single Channel Ground and Airborne Radio System

BACKGROUND AND COMPOSITION OF ACCS PROGRAMS

According to the Army Posture Statement for fiscal year 1988, command and control capabilities are one of the Army's highest priorities. When the ACCS is fielded in the 1990s as the Army plans, the Army will have spent over $20 billion for a fully integrated network of computers, radios, and other equipment. The ACCS and associated communications are intended to help battlefield commanders from the corps down to the battalion level to manage and control their resources more effectively.

An objective of the ACCS effort is to have computer commonality for the major control systems, and this is to be provided by the ACCS CHS program in four of the five main command and control systems. Computer commonality has been a long-time Army goal that originally had its roots in the defunct Military Computer Family program. Essentially, its goal is to reverse the proliferation of unique systems.

ACCS ARCHITECTURE

ACCS is designed to improve the coordination and control of combat forces through automated management of five key battlefield functional areas linked together by three communication systems. The following eight[1] systems comprise the ACCS architecture:

-- Maneuver Control System (MCS) for control of all combat forces;

-- Forward Area Air Defense Command, Control, and Intelligence (FAAD C2I) System for short-range air defense weapons control;

-- Combat Service Support Control System (CSSCS) for combat service support automation;

-- All Source Analysis System (ASAS) for collection and analysis of time critical intelligence/electronic warfare;

-- The Advanced Field Artillery Tactical Data System (AFATDS) for automated fire support and planning;

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[1]A ninth system, the Unit Level Computer, was added to the ACCS CHS procurement in late 1986. It is subordinate to the Combat Service Support Control System. The Unit Level Computer is more thoroughly discussed in our report on Battlefield Automation: Army Efforts to Automate Combat Service Support (GAO/NSIAD-87-178FS, July 1987).

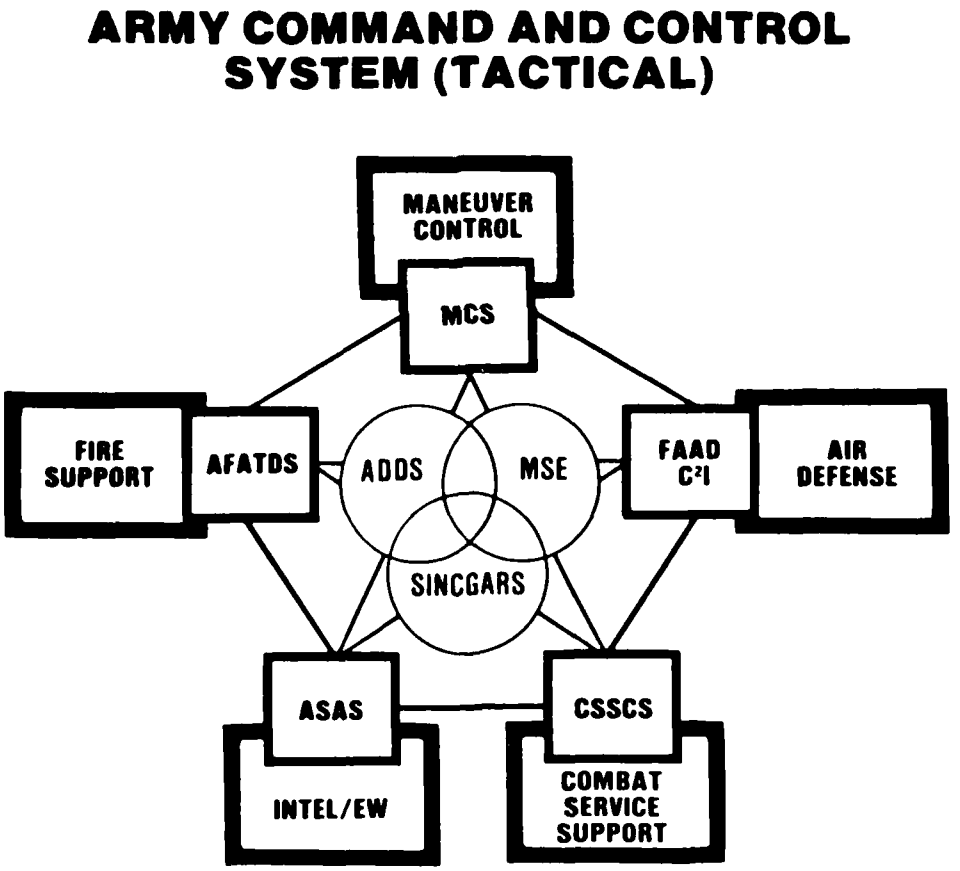
-- Mobile subscriber equipment (MSE) for areawide switched communications;

-- Single Channel Ground and Airborne Radio System (SINCGARS) primarily for voice radio communications; and

-- Army Data Distribution System (ADDS) for data communications. ADDS consists of the Enhanced Position Location Reporting System (EPLRS) and Joint Tactical Information Distribution System (JTIDS).

Figure I.1 shows the functional areas and the corresponding systems that comprise the ACCS architecture.

Figure I.1: ACCS Architecture and Battlefield Functional Areas



Source: US Army

MCS

MCS provides computer-aided decision support for general control of all combat forces. It enables command staff to collect and review important battlefield information and to produce and communicate subsequent battle plans, orders, and enemy and friendly situation reports. To further aid commanders' decisionmaking processes, MCS will be linked to the other four control systems.

The Army is fielding two types of computers for the near term, militarized computers and nondevelopmental item computers. In the future, both systems will be replaced by ACCS CHS. Production models of the militarized system are being tested and evaluated with units in Germany. The nondevelopmental item version, to be interoperable with the militarized system, is scheduled to be fielded in October 1988. ACCS CHS is scheduled to replace the militarized and nondevelopmental item computers beginning in fiscal year 1993.

FAAD C2I

The FAAD C2I system is being developed to automate the command and control of short-range air defense weapons. It is being designed to acquire, identify, process, and instantaneously disseminate information on enemy and friendly aircraft for forward area air defense units.

The four basic elements of FAAD C2I are in various acquisition phases with production and development occurring concurrently. The basic command and control element is in full-scale development, the ground sensor element is a nondevelopmental item and has been approved for low-rate initial production, the aerial sensor element is in the concept definition phase, and an improved aircraft identification friend or foe element is in the advanced development phase. Meanwhile, another identification friend or foe system using different technology is also undergoing development to provide a more positive way to identify enemy aircraft.

The Army plans to field the basic system in 1991-1992 before the aerial sensor or identification friend or foe elements are available. The improved aircraft identification features are to be fielded in 1993, and the aerial sensor is to be fielded in 1995.

CSSCS

The CSSCS program's concept definition phase started in fiscal year 1987. It is being developed to automate efforts to collect, summarize, and organize information contained in several subordinate supply, maintenance, ammunition, transportation, personnel, and medical systems. It is also to provide information

to the other functional area commanders in air defense, fire support, intelligence, and maneuver to help them manage their combat resources and operations.

A major sub-element of the CSSCS is the Unit Level Computer, formerly a separate program to acquire nondevelopmental item microcomputers to process combat service support information at the battalion and company level. The Army had planned to buy 13,000 nondevelopmental item computers costing about $65 million. The plan was canceled and the procurement transferred to the ACCS CHS program based on the Under Secretary of the Army's November 1986 directive.

Current plans are to spend $178.4 million for 12,903 commercial CHS portable models, funded mostly (94 percent) by the operation and maintenance appropriations of individual Army units. The initial operational capability is scheduled for the fourth quarter fiscal year 1988. As many as 65,000 Unit Level Computers may eventually be purchased under the proposed contract.

ASAS

ASAS is the Army's portion of the Joint Tactical Fusion Program, a joint program with the Air Force to automate the correlation and analysis of high volumes of time-sensitive intelligence. The program has its roots in a 1980 directive from the House Committee on Appropriations and the House Permanent Select Committee on Intelligence to consolidate separate Army and Air Force efforts to automate intelligence fusion systems. Currently, the Army funds about 90 percent of the program.

ASAS is intended to collect and process information on the types of enemy units, as well as their locations, movement, and projected capabilities and intentions. It is to automate data analysis and provide a coherent picture of the enemy situation and disseminate this information to commanders so that they can make timely, well-informed decisions. These functions, which can take days to perform with current systems, can be done in minutes, if ASAS performs as expected.

Full-scale engineering development began in March 1983 using an evolutionary approach that incrementally enhances system software as user experience and technology increases. The system is expected to be fielded in the 1990s.

Unlike the other four command and control systems, ASAS does not use the Ada programming language. Because ASAS is programmed in more than 2 million lines of Fortran, program officials believe it is not practical to reprogram the software in Ada. However,

program officials told us they would consider using Ada for any new software features that would be added after production begins.

In addition, ASAS is exempt from using ACCS CHS mainly because ASAS is too far along to switch to a new computer. Program officials told us that changing computers would cause major disruptions to the program.

Although ASAS will not use Ada or ACCS CHS, it will be able to communicate with other command and control systems through the use of special protocols and other means.

AFATDS

AFATDS is being developed to automate efforts to plan, coordinate, and execute artillery fire, counterfire, and interdiction and suppression of enemy fire. It is intended to meet fire support requirements of the Army during the 1990s and beyond, and be compatible with all existing and planned U.S. and allied field artillery systems and sensors. By being much smaller and easier to use, it is supposed to correct the deficiencies of the outmoded Tactical Fire Direction System with no increase in personnel.

The program, currently in the concept evaluation phase, is very dependent on software development. Controversy exists in the Congress and in the Army over whether light divisions should wait for the AFATDS or procure a system with limited capability that has been developed and successfully tested against its limited requirements by the 9th Infantry Division, and thus obtain some operational capability sooner. Additional information on AFATDS and the more limited system is contained in our July 1987 report.[1]

MSE

MSE is being acquired to provide areawide telephone-like communications to mobile and stationary users, including voice, data, and facsimile capability for corps and divisions. One of the network's features is that it will automatically reroute communications around damaged or jammed nodes.

The underlying concept of MSE is that area communications provided at corps and below must be more mobile, less labor intensive, and more survivable than existing area communications facilities to better support combat forces. Consisting of radio telephones, switches, generators, trucks, and automated control centers, the system is designed to interoperate with the Tri-Service Joint

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[2]Battlefield Automation: Field Artillery Data System Acquisition Problems and Budget Impacts (GAO/NSIAD-87-198BR, July 1987).

Tactical Communications System, combat net radio, commercial telephone systems, and the North Atlantic Treaty Organization communications networks.

The MSE production contract was awarded in 1985. Through fiscal year 1991 the Army expects to acquire enough equipment to support 2 training bases, 28 divisions, and 20 corps battalions.

SINCGARS

SINCGARS is being acquired to provide the Army's next generation of lightweight, secure, very high frequency combat net radios. It will be the primary means of command and control for smaller Army units down to the platoon level. It is to be capable of transmitting voice and data in an electronically hostile environment by using an antijamming technique known as frequency hopping. SINCGARS will be produced in backpack, vehicle, and airborne models.

ADDS

ADDS consists of two separate programs--EPLRS and JTIDS. EPLRS is the Army's enhancement of the Position Location Reporting System (PLRS) which is currently being produced for the Marine Corps. EPLRS is intended to satisfy low- and medium-rate data communication needs within the division such as artillery and forward area air defense units. JTIDS, an Air Force led program, is being developed for high-rate data users, such as intelligence and long-range air defense units in corps and divisions.

In addition, the EPLRS and JTIDS can provide the instantaneous locations of friendly troops and navigation aids to vehicles, boats, helicopters, and fixed-winged aircraft.

The ACCS CHS Program

The ACCS CHS program consolidates the acquisition of computer hardware and to a lesser degree, software, for four of the five primary control systems. The Army estimates it will need 3,600 computers costing about $909 million, excluding AFAS but including the Unit Level Computer (12,903 computers). AFATDS is also a primary user and accounts for most of the dollars or about $476 million of the total estimated computer procurement.

The program's goal is to maximize the use of nondevelopmental computers (and limit the ruggedized versions for use in more stringent conditions), to ease the maintenance burden, and lower the acquisition cost of using modern computer in all battlefield functional areas.

APPENDIX II

ACCS MANAGEMENT, SCHEDULE, AND COST CHANGES IN THE PAST YEAR

Since our August 1986 report,[1] most ACCS programs have experienced delays in development and production and are progressing at a slower pace than planned by the Army. Costs have increased for most ACCS programs in the past year, particularly in the FAAD C3I program.

Of the many program changes in the past year, perhaps the most dramatic is the change in the Army's management structure and its potential impact on command, control, and communications programs.

MANAGEMENT STRUCTURE REORGANIZED

The Army established a new acquisition management structure known as the Program Executive Officer Concept, effective May 1, 1987. The Program Executive Officer Concept is intended to streamline and improve the acquisition process in accordance with the Goldwater-Nichols DOD Reorganization Act of 1986 (Public Law 99-433) and National Security Decision Directive 219.[2]

The new Program Executive Officer for Command and Control Systems replaces the former Program Manager for ACCS. The program executive officer has full management responsibility for oversight of CHS and the five separate command and control programs with no intervening review or approval. The program executive officer is responsible and reports directly to the Under Secretary of the Army, who is the Army Acquisition Executive. This is supposed to eliminate the Army Materiel Command from program supervision.

Although the ACCS concept embodies communications, there is a separate program executive officer who oversees communications programs, including the three discussed in this report.

Last year, we reported that the Army had difficulty in moving the ACCS CHS program forward because of delays in deciding how much authority to give the program manager. After several delays caused by many changes to the request for proposal, the Office of Project Manager for CHS was established on June 30, 1987, under the program executive officer. The CHS project manager's authority is limited

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[1]Battlefield Automation: Status of the Army Command and Control System Program (GAO/NSIAD-86-184FS, August 1986).

[2]Implementation of the Recommendation of the President's Commission on Defense Management (April 1, 1986).

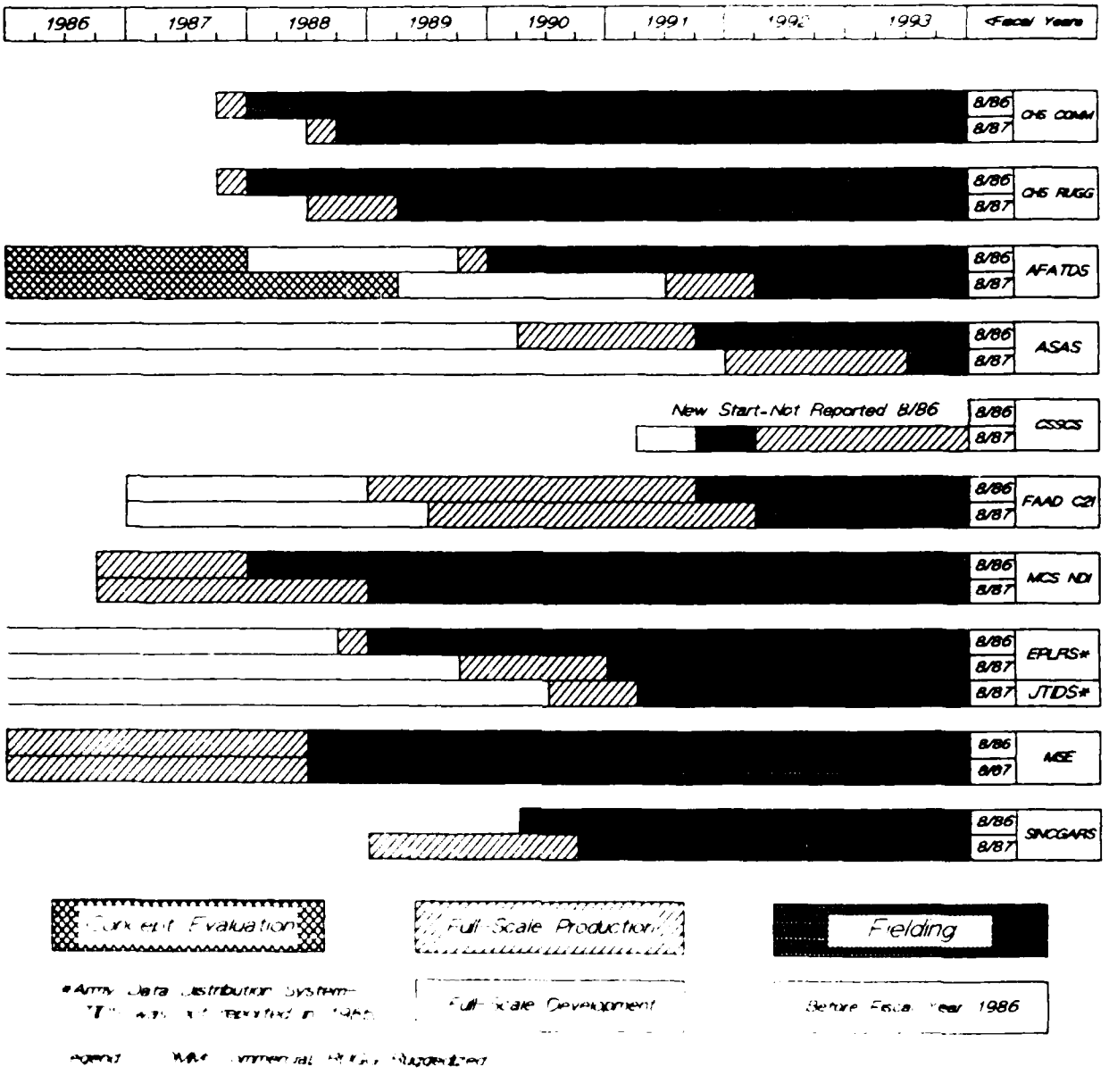
to procurement of computers and peripheral equipment for four of the five command and control systems and for the unit level computer under CSSCS.

STATUS OF PROGRAMS AND SCHEDULE CHANGES

During the past year, the initial operational capability for eight of nine programs has slipped from 6 to 28 months. Delays were mainly due to software development problems in three programs and production problems in two programs. Three other programs experienced delays because either the request for proposal was delayed, development started late, or the program was postponed until a required Army study was made for and evaluated by the Congress. Only the MSE schedule remained unchanged.

Figure II.1 and table II.1 show the current acquisition schedules for selected milestones of the ACCS programs (including both commercial and ruggedized versions of the CHS program) compared to the schedules reported last year. The selected milestones are full-scale development decision (milestone II), full-scale production decision (milestone IIIb), and initial operational capability and subsequent fielding.

Figure II.1: ACCS Schedule Comparison, August 1986 to August 1987



APPENDIX II

Table II.1: ACCS Programs Schedule Changes from August 1986 to August 1987

	Milestone II			Milestone IIIB			IOC			
Program	8/86	8/87	Change (months)	8/86	8/87	Change (months)	8/86	8/87	Change (months)	Explanation
Command & Control:										
CHS-commercial	N/A	N/A	-	6/87[a]	4/88	10	9/87	7/88[b]	10	Request for proposal delayed.
CHS-ruggedized	N/A	N/A	-	6/87[a]	4/88	10	9/87	1/89[b]	16	Same as above.
AFATDS	9/87	1/89	16	6/89	4/91	22	9/89	1/92	28	S/W development problems.
ASAS	3/83	3/83	-	1/90	10/91	21	7/91	4/93	21	S/W development problems. Program changes.
CSSCS	N/R	1/91	-	N/R	1/92	-	9/89	7/91[c]	22	Development started late.
FAAD C2I	9/86	9/86	-	9/88	3/89	6	7/91	1/92	6	CHS delayed S/W development.
MCS (NDI)	N/A	N/A	-	6/86	6/86	-	10/87	10/88	12	Required Army Study for Congress.
MCS (CHS)	N/A	N/A	-	N/R	10/91	-	10/91	10/92	12	Deferred by NDI above.
Communications:										
ADDS (EPLRS)	4/85	4/85	-	7/88	6/89	11	9/88	9/90	24	Production reliability problems with PLRS.
ADDS (JTIDS)	N/A	1/81	-	N/A	4/90	-	N/A	1/91	N/A	Became a stand alone system in September 1986.
MSE	N/A	N/A	-	12/85	12/85	-	5/88	5/88[c]	-	On schedule.
SINCGARS	N/A	N/A	-	N/A	9/88	-	12/89	7/90	7	Production reliability problems.

[a]For CHS, milestone IIIB equates to date of production contract award.
[b]CHS IOC reflects hardware delivery dates since CHS is not a system.
[c]MCS uses first unit equipped in lieu of IOC.

Key:

Milestone II = Full-scale development decision
Milestone IIIB = Full-scale production decision
IOC = Initial operational capability
NDI = Nondevelopmental item
N/A = Not applicable
N/R = Not reported
S/W = Software

The following is a profile of each program's current status and schedule change from our August 1986 report.

ACCS CHS

Problems in redefining requirements caused an 11-month delay in issuing the request for proposal from June 1986 to May 1987. The Army expects to award a 5-year, $200 million production contract for 4,259 computers (excluding the Unit Level Computer procurement) in April 1988, 10 months later than scheduled. If all goes as planned, deliveries of commercial hardware are expected to begin in July 1988, followed by ruggedized hardware in January 1989. The Army is deciding on whether to award a 5-year contract or a 1-year contract with options.

Because development of the major command and control systems that will use much of the ACCS CHS has slipped, the corresponding CHS may not be needed in fiscal year 1988. If the Army awards a production contract in fiscal year 1988 as planned, it could have millions of dollars of equipment before the four command and control systems users have their applications software ready for systems integration. For example, AFATDS, a major user of ACCS CHS, would not be ready to use large quantities of computers until it makes its full-rate production decision. This decision is not scheduled to occur until April 1991, or almost 2 years after ruggedized models of ACCS CHS would be available in early 1989.

Army officials acknowledged that the required number of ACCS CHS for fiscal year 1988 is unknown, but that some quantities would be needed for development of AFATDS, FAAD C2I, and CSSCS. A detailed scrub of ACCS CHS quantities for fiscal year 1988 is in process, according to the officials. With a projected requirement for 5,276 computers in fiscal year 1988, the Unit Level Computer appears to be the only user needing large quantities of ACCS CHS in 1988.

We are reviewing the cost effectiveness of ACCS CHS and will be reporting on it at a later date.

AFATDS

AFATDS continues to experience software development problems. As of July 31, 1987, the Army planned to complete its concept evaluation phase in May 1988, 14 months later than originally planned. In August 1987, Army officials stated that the contractor was an additional month behind schedule.

In July 1987, we reported[3] that the new schedule for follow-on development and production does not allow sufficient time for appropriate tests, evaluations, and reviews. We also reported that based on Army estimates, the initial operational capability for light divisions would slip about 3 years to January 1992. Although heavy division fielding schedules have not been revised to reflect the latest development problems, fielding would probably not occur before January 1995.

Program officials are revising the schedule that will be submitted to the Under Secretary of the Army. In September 1987, the Program Executive Officer for Command and Control Systems proposed an accelerated AFATDS fielding schedule of June 1990 for light divisions and 1991 for heavy divisions. However, this schedule would be achieved by reducing requirements and deploying less capable systems than originally planned.

AFATDS' fiscal year 1988 procurement request was based on the need for ACCS CHS to meet a third quarter, fiscal year 1990 fielding date. However, the projected fielding date, whether it occurs in fiscal year 1990 or 1992, would eliminate the need to begin acquiring ACCS CHS in fiscal year 1988 as planned.

ASAS

ASAS is the only major element of the ACCS architecture that is not currently part of the ACCS CHS procurement. After years of software development problems and program instability, the Army is rescoping the program. Since June 1984, there have been six major revisions to the program. Currently, requirements are being reduced to provide more attainable capabilities.

A partial system was delivered for field testing in December 1986 on schedule, and the Army considered the test to be successful. However, due to the software problems, program changes, and higher cost estimates, the production and initial operational capability schedules for the full system have slipped about 21 months since August 1986.

Program officials told us they were reviewing and revising acquisition costs, initial operational capability dates, and other major milestones while preparing the new acquisition plan. This plan was approved by DOD's Joint Oversight Group on November 2, 1987. In the new plan, milestone III production is on schedule for the first quarter fiscal year 1992, but costs have increased and some capability has been deferred to a preplanned product

[3]Battlefield Automation: Field Artillery Data Systems Acquisition Problems and Budget Impacts (GAO/NSIAD-87-198BR, July 1987).

improvement program. The Army intends to produce and deliver a limited capability system in April 1989 for field testing at Fort Hood, Texas. Program officials told us that the new acquisition plan is realistic and they intend to maintain it.

CSSCS

Last year, the CSSCS program was undefined, unfunded, and had no approved operational capability requirements. In fiscal year 1987, the program entered its concept definition phase, the equivalent of advanced development.

Software development is to start in fiscal year 1988 and portable, commercial versions of the ACCS CHS are to be phased into the development effort during fiscal year 1989. Initial operational capability is scheduled for July 1991.

FAAD C2I

According to program officials, delays in the availability of ACCS CHS computers will also delay the completion of the software development phase at least 6 months. Based on this delay, the initial operational capability of the basic system will probably slip from July 1991 to January 1992. A program official told us that the integration of FAAD C2I with other systems could prove to be a potential problem that could also delay the program's schedule.

In addition, the start of full-scale development of aerial sensors has slipped about a year to April 1989 because of funding cuts by the Army.

The milestones for the nondevelopmental item ground sensor and the aircraft identification friend or foe system have remained about the same as those approved in August 1986.

MCS

Militarized computers were delivered to U.S. Army, Europe in November 1986. Tests held in Germany during April 1987 identified deficiencies with the militarized system's effectiveness, reliability, and communications compatibility. This led one of the participants in the test, the Army Materiel Systems Analysis Agency, to conclude that the performance of the MCS did not exhibit adequate readiness for fielding. They recommended against any further fielding of the militarized equipment until deficiencies were corrected.

The Army held an additional test on August 15 to 17, 1987, in Germany. Program officials considered the test to be successful because the deficiencies previously noted were corrected. However, test results are still being evaluated and no report is available yet.

The Army intended to award a nondevelopmental item contract in August 1986. The House Appropriations Committee questioned the appropriateness of procuring commercial, nondevelopmental item computers instead of ACCS CHS. The Army responded in March 1987, obtained congressional approval in May 1987, and awarded a contract for computers in July 1987. ACCS CHS for the MCS is to be fielded beginning in October 1992, and will use the same software as the militarized and nondevelopmental item MCS systems.

The Army continues to develop additional MCS software to meet system requirements. Total system software is scheduled to be available in January 1989, about 4 months later than the Army's plan last year.

ADDS-EPLRS

The EPLRS schedule has slipped because of production and reliability problems with the PLRS program on which it is based.

The Army plans to award a low-rate production contract for EPLRS in February 1988, 11 months behind schedule but 13 months before it expects to complete the initial operational test and evaluation (March 1989). Furthermore, full-rate production is expected to begin in June 1989, 10 months before first article testing is scheduled to be completed in April 1990.

The Army chose this accelerated acquisition schedule because (1) EPLRS needed to be fielded for use with the initial fielding of the FAAD C2I system and (2) the EPLRS program could be accelerated since its design is based on a preplanned product improvement to PLRS. But those reasons seem to be less valid at this time.

First, the Army's plans to field FAAD C2I in July 1991 have slipped to January 1992. ADDS is to be fielded in September 1990, 16 months earlier. Second, although EPLRS is based on the PLRS design, 40 percent of EPLRS' modules are unique; therefore, the successful resolution of problems and testing of PLRS does not necessarily demonstrate that EPLRS is ready for production.

However, if ADDS were fielded earlier, it could support the intelligence/electronic warfare community, the Army's currently fielded fire support system called the Tactical Fire Direction System, and other deployed systems.

ADDS-JTIDS

Delivery of the first JTIDS class 2M engineering model has slipped from June 1987 to December 1987 due to engineering changes to enhance the system. A request for proposal for about 18 additional class 2M terminals was issued on May 19, 1987, and the contract is expected to be awarded in February 1988.

MSE

The MSE production contract was awarded in December 1985 and the program appears to be on track. The Army plans to operationally test it in its final configuration during a follow-on test and evaluation scheduled for May 1988.

The follow-on test and evaluation will provide data needed for a third option production decision in September 1988 worth $1.02 billion. The schedule allows 90 days to do the follow-on test and evaluation and brief the results to the decisionmakers. DOD and Army test agency officials told us that although the test would appear to be very thorough, they were concerned about whether all of the tests can be performed as scheduled. Program officials acknowledge that there is no margin for error if the schedule is to be met.

Under the basic contract, the last option will be awarded in fiscal year 1990, resulting in the completion of all MSE fielding in November 1993. Provisions have been made, however, to procure more MSE equipment in fiscal year 1991 for the additional divisions created during the last few years.

SINCGARS

The SINCGARS program has been plagued with production and reliability problems ever since the engineering development phase was bypassed in order to start initial production in fiscal year 1983. After the program experienced difficulties in first article tests in 1985 and continued to experience problems in fiscal year 1986, the Army canceled progress payments to the contractor. As a result, the Congress deleted all but $10 million of the SINCGARS' $209 million budget request for fiscal year 1987.

In 1986 the Army began a market survey to explore alternatives that could serve as an interim replacement. They found that none of the nine nondevelopmental radios submitted for comparative testing could meet all of the requirements. This was especially true in the area of reliability, SINCGARS' most significant problem.

In the spring of 1987, SINCGARS' contractor began to report increases in SINCGARS reliability. Contractor reports indicate that 1,700 hours mean time between failures was achieved. As a result of this progress, the Army agreed to resume progress payments in May 1987 and to modify the contract by late November 1987.

A key test for SINCGARS will be the Product Reliability Acceptance Test of the ground radios scheduled for November through December 1987. If successful, the Army expects deliveries of the ground radios, made under the 1985 initial production contract, to begin in January 1988. This reflects a 29-month delay from the original delivery date of August 1985.

Moreover, the Army plans to procure 720 aircraft radios in January 1988 under an initial production contract awarded in fiscal year 1985. However, the airborne radio has not been operationally tested. The production decision for the airborne radio will be based on a limited production qualification test scheduled to be completed in March 1988. A limited operational test of 2 airborne radios is scheduled for April 1988 and an operational test of 35 production radios for October 1990. Production is scheduled to begin before an operational test so that the airborne and ground radios can be fielded at the same time.

In addition, in September 1987, the Army issued a request for proposal to award a contract in May 1988 to a second source with options for up to 29,000 radios having an integrated communications security feature. The second-source design is to be of the same form, fit, and function as the radio currently being developed with this feature. However, it could also be a unique design in terms of components and logistics burden.

CHANGES IN COST ESTIMATES

Based on Army estimates, the consolidated cost of the ACCS programs increased from about $19.4 billion to about $21.4 billion, or almost $2 billion in the August 1986 through August 1987 time frame. This change includes about $153 million for a new start for CSSCS, and about a $1 billion decrease in AFATDS due to deleted requirements or quantities. However costs increased in the six other programs, primarily because of quantity increases. In addition, problems in software development and production contributed to increased costs.

Table II.2 shows the changes over the past year in Army cost estimates to acquire the major ACCS programs.

APPENDIX II

Table II.2: Changes in Army Estimates of ACCS Acquisition[a] Costs From August 1986 to August 1987

	1986	1987	Increase (decrease)	Explanation
	(in millions)			
AFATDS	$ 2,134.4	$ 1,110.7	($1,023.7)	Reduced requirements and inflation rates.
ASAS	2,439.4	2,600.0	160.6	Increased hardware costs and software problems.[b]
CSSCS	0	153.1[c]	153.1	New start.
FAAD C2I	1,817.5	2,640.1	822.6	Aircraft identification added. Further increases expected for omitted items.
MCS	446.7	932.0	485.3	Adds 2,953 ACCS CHS computers; and software problems.
Total Command and Control	6,838.0	7,435.9[d]	597.9	
ADDS	2,763.4	3,615.3	851.9	Changed requirements, increased quantities.
MSE	4,298.0	4,654.0	356.0	Additional units.
SINCGARS	5,527.5	5,652.4	124.9	Cost, schedule, and requirements changes; production and reliability problems.
Total Communications	12,588.9	13,921.7	1,332.8	
Total	$19,426.9	$21,357.6	$1,930.7	

[a]Acquisition costs consist of development and procurement funds.
[b]Cost increases were anticipated in August 1987 but were not announced until November 1987.
[c]Includes $72.6 million of operation and maintenance funds for development applications software.
[d]Includes $730.9 million for the ACCS CHS program which is funded from the programs above, excluding ASAS. However, these costs do not include the $178.4 million cost of the Unit Level Computer program which was added to the ACCS CHS consolidated acquisition.

Table II.2 does not include about $3.2 billion for the FAAD C2I program, as follows:

-- $900 million to equip reserves with the basic command and control system and the ground sensor,

-- $608 million to similarly equip corps missile battalions, and

-- $1.7 billion for war reserves.

Equipment for reserve units and war reserves were included in the cost estimates of other ACCS programs.

The FAAD C2I program cost growth of more than $800 million is mainly due to (1) the $500 million aircraft identification element, a new item not included in last year's estimate and (2) cost increases on the aerial sensor element.

Another significant cost change in the past year reduced the AFATDS program estimate by about $1 billion, due to lower requirements, reduced quantities, and revised cost estimates using more current, lower estimates of future years' inflation.

The Army established a new program plan for ASAS in early November 1987, as we were processing this report. Based on this plan, Army estimates for ASAS amount to $2.6 billion, an increase of about $160 million for a less capable system. Cost increased due to increased hardware costs and due to program funding instability and schedule slips caused by software development problems.

The ACCS CHS costs of $730.9 million noted in table II.2, does not include the estimated cost of the Unit Level Computer of $178.4 million, almost all of which, $168.1 million, involves operation and maintenance funding.

Costs more than doubled in the MCS program to $932 million because 2,953 additional ACCS CHS computers are going to be acquired, including battalion terminals not included in last year's program.

Costs in the communications area increased about $1.3 billion to $13.9 billion as follows:

-- ADDS program costs increased $851.9 million to $3.6 billion because requirements changed and quantities increased in the past year.

-- MSE costs increased more than $350 million to $4.6 billion, or about 8 percent, in order to equip the four new divisions that were created by the Army in the past few years.

-- SINCGARS costs increased $124.9 million to $5.7 billion, or about 2 percent, due to a variety of factors such as cost estimate revisions, changed requirements, and schedule slips.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of our review was to provide updated information on ACCS, its communications architecture, and acquisition programs.

We reviewed current and past cost estimates, schedules, and transition plans for nine programs: five command and control programs, one common hardware program, and three communication programs. We also reviewed the Army Command and Control Master Plan and other pertinent DOD, Army, and contractor documents.

In addition, we interviewed key officials at

-- ACCS CHS, AFATDS, MCS, ADDS, MSE, and SINCGARS program offices in Fort Monmouth, New Jersey;

-- the FAAD C2I program office in Huntsville, Alabama;

-- the CSSCS program office in Fort Belvoir, Virginia:

-- the ASAS program office in McLean, Virginia;

-- various Army units in Frankfurt, Stuttgart, Heidelberg, and Worms, Germany;

-- DOD and Army test agencies in Falls Church, Virginia, Aberdeen Proving Grounds, Maryland, and Washington, D.C.;

-- two contractor offices in Fullerton, California, and Needham Heights, Massachusetts; and

-- an official from the former Office of Assistant Chief of Staff for Information Management in the Pentagon, Washington, D.C.

Our review was performed from November 1986 through August 1987.

OTHER REPORTS ON ACCS

RELATED PROGRAMS

Evaluation of Army's Mobile Subscriber Equipment Program (GAO/NSIAD-85-117, July 1985)

Tactical Computers: Army's Maneuver Control System Procurement and Distribution Plan (GAO/IMTEC-86-21FS, May 1986)

Fire Support System: Army's Plans to Improve Its Fire Support Capabilities (GAO/NSIAD-86-115BR, May 1986)

Tactical Intelligence: DOD's Joint Tactical Fusion Program (GAO/C-NSIAD-86-27, July 1986)

Battlefield Automation: Status of the Army Command and Control System Program (GAO/NSIAD-86-184FS, August 1986)

Tactical Computers: Army's Maneuver Control System Acquisition Plan Is Not Cost-Effective (GAO/IMTEC-86-26BR, September 1986)

Fire Support System: Army's Plans to Improve Its Fire Support Capabilities (GAO/NSIAD-86-116BR, September 1986)

Fire Support System: Status of the Fire Support System's Development (GAO/NSIAD-86-212FS, September 1986)

DOD Acquisition Programs: Status of Selected Systems (GAO/NSIAD-87-128, April 1987)

Battlefield Automation: Army Efforts to Automate Combat Service Support (GAO/NSIAD-87-178FS, July 1987)

Battlefield Automation: Field Artillery Data System's Acquisition Problems and Budget Impacts (GAO/NSIAD-87-198BR, July 1987)

Battlefield Automation: Army Air Defense Command and Control System Acquisition and Budget Issues (GAO/NSIAD-87-208, September 1987)

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